REMARKS

This Amendment is submitted in response to the Office Action dated March 20, 2003 ("the Action"). Claims 1-16 are pending in the application but stand rejected under one or more of 35 USC §102 and §103. Applicants respectfully disagree and will address the rejections below.

I. Arrangement of the Specification

Applicants have amended the specification hereinabove into a more standardized format as suggested by the Examiner.

II. Informalities in the Claims

The Action states that Claims 1-15 are objected to because of certain informalities in the claims. Claims 1 and 6 have been amended to correct the noted informalities. Claims 7 and 9-15 have been amended so that they depend from device Claim 6. Claim 8 depends from Claim 7. Thus, Applicants respectfully submit that the informalities noted have been obviated and request that this rejection be withdrawn.

III. §112, Second Paragraph

Claims 1-5 and 13 stand rejected under §112, second paragraph, as being indefinite for the use of the terms "intervening array geometry" (Claim 1) and "closed system" (Claim 13). Applicants respectfully disagree.

The term "intervening array geometry" as recited in Claim 1 is used to define the geometric relationship of the magnets and the holders for the containers. Claim 1 states in part: "the magnets and the holders for the container are placed in intervening array geometries." An array is "an orderly arrangement" (shown, for example, as substantially aligned rows or columns of magnets and containers) and the term "intervening" means "between." *See, e.g.*, Webster's II, New Riverside University Dictionary (Houghton Mifflin Co., Copyr. 1984, 1988). Thus, Applicants respectfully submit that one of skill in the art would understand that the term relates to geometric arrangements of magnets that are configured in a plurality of spaced apart magnet

arrays with containers that are held in holders in container arrays with the container arrays placed between (intervening) the magnet arrays. Hence, the magnets and holders for the containers are in intervening array geometries (an array of magnets followed by an array of containers followed by an array of magnets).

This term is also described at page 5, lines 18-22 and page 8, lines 40 et seq. to page 9, line 2, and shown, for example, in Figure 2. Referring to Figure 2, a device with a plurality of magnet arrays is shown. In this embodiment, a first magnet array is disposed along a first line and a second magnet array is disposed along a second line that is spaced apart from the first line. A first row of containers having a sample and magnetic or magnetizable particles therein is disposed intermediate the two rows of magnet arrays, with each magnet array configured to move repetitively back and forth (oscillate) to apply magnetic forces in a manner that moves the particles from one side of the containers to the other. However, Claim 1 has been amended above to clarify the arrangement of the intervening array geometry in a non-narrowing manner in order to advance prosecution.

Similarly, the term "closed system" is also defined in the specification such as at page 5, lines 29-35 and as shown in Figure 3 and is well understood by those of skill in the art. As described at page 5, embodiments of the invention may use discrete "batch" vessel type containers or "tubes" (*see, e.g.*, Figure 3) that allow for serial introduction and removal of flowable samples, without requiring removal of the tube from its operative location in the mixing device/system, thereby allowing processing of the particles "in a closed system." Again, Applicants respectfully submit that this term is sufficiently clear such that one of skill in the art would understand this claim recitation. However, Claim 13 has been amended to further clarify the meaning of this term in a non-narrowing manner in order to advance prosecution.

In view of the foregoing, Applicants respectfully request that this rejection be withdrawn.

IV. The Prior Art Rejections

Claims 1-4, 6, 9, 11 and 13 stand rejected as being anticipated by U.S. Patent No. 5,770,461 to Sakazume (hereinafter "D1"). Claims 5, 10, 14 and 15 stand rejected as being obvious in view of D1 and in further view of WO 96/26011 to Kirchanski et al. (hereinafter "D2"). Other claims stand rejected in view of D1 and one or more other secondary references. Applicants respectfully disagree.

The Action states that D1 proposes a method and apparatus using magnets 27 with like poles facing each other "in an array" with a linear "array" of containers "intervening." The Action states that the containers move as shown by the arrows at Figures 8 and 9 to provide a varying magnetic field. Applicants respectfully submit that the citation to Figures 8 and 9 appears incorrect. For the purposes of this Response, Applicants will assume that this citation was meant to refer to Figures 6 and 7, as these figures illustrate containers with arrows illustrating movement with respect to magnets. The Action characterizes the system as "closed" because the turntable turns in a "closed circle." The Action concedes that D1 fails to teach moving the magnets or nuclei acid isolation.

First, Applicants submit that the object of D1 is to promote flocculation of the magnetic particles or the formation of "clots" in order to obtain a faster separation of the particles from a liquid phase (*see, e.g.*, col. 2, lines 18-20). In contrast, certain embodiments of the present invention are directed to processing clots or particles so that clot formation of the particles is inhibited to promote efficient mixing with the fluid (*see*, page 3, lines 9-13 and page 4, lines 30-32 of the pending specification). *See* new dependent Claims 17, 18, 23 and 24.

Further, the claimed invention generates the magnetic field and mixes the fluid samples differently from that proposed by either Figure 6 or 7 of D1. As noted by the Action, Figure 6 of D1 illustrates an "array of containers" positioned intermediate rows of static permanent magnets with the containers configured to move forward to mix the fluid and particles as the containers travel in one direction (col. 9, lines 15-17). The embodiment shown in Figure 7 of D1 proposes placing a single static permanent magnet (not magnet arrays) on opposing sides of a row of containers and oscillating the containers back and forth. Although D1 appears quite exhaustive in its

discussion of potential configurations of permanent and electromagnetic magnets to mix fluids in the containers, it fails to teach or suggest, *inter alia*: (a) moving the magnets; (b) oscillating container arrays between corresponding arrays of magnets, to simultaneously expose a plurality of containers to varying magnetic fields to mix the fluid samples therein as recited in Claim 1 hereinabove; or (c) moving a plurality of container arrays with respect to a plurality of magnet arrays (*see, e.g.*, Claims 32, 37). The arrays of magnets can be adjacently positioned (near or in proximity to opposing sides of a respective container array). One magnet array may cooperate with (be adjacent or near) two different container arrays (*see* Figure 2).

The Action states that D2 teaches a method and apparatus similar to D1 and that "nucleic acids are taught as an alternative to antibodies in biospecific affinity reaction." The Action also states that D2 teaches moving the magnets relative to a stationary container (citing Figures 1-4 in support of this position).

Again, D2, similar to D1, does not teach or suggest a starting particle material that is a clot or aggregate of magnetic particles. D2 states at page 3, lines 7-14, that:

> The magnetic separation process typically involves mixing the sample with paramagnetic particles in a liquid medium to bind the target substance by affinity reaction, and then separating the bound particle/target complex from the sample medium by applying a magnetic field. All magnetic particles except those that are colloidal settle in time. The liquid medium, therefore, must be agitated to some degree to keep the particles suspended for a sufficient period of time to allow the bioaffinity binding reaction to occur.

Thus, a goal of D2 is to prevent sedimentation of the suspended particles without excess turbulence in the liquid. *See also*, page 5, lines 30-32.

Further, D2 fails to teach or suggest the moving intervening array geometries, with a plurality of magnet arrays as claimed by the pending claims. For example, Figure 1 proposes a static magnet with a rotatable container configuration. Figure 2 illustrates a rotatable mobile magnet positioned to cooperate with a stationary container. Figure 3 employs a single magnet for each container, with the container rotating to position different portions of the container adjacent the single magnet to mix the particles therein. Figure 4 illustrates a row of stationary magnets with a row of rotatable containers. (*See, e.g.*, Figures 1-4 and page 6, lines 25-31 and page 7, lines 1-7).

D2 fails to teach or suggest, *inter alia*, a plurality of magnet arrays that cooperate to mix the particles in one or more arrays of containers.

In contrast, embodiments of the present invention employ an intervening array geometry of containers and permanent magnets (an example is shown in Figure 2 of the pending application). In certain embodiments, unlike the flocculation promoting system of D1, the mixing system of the present invention employs a plurality of discrete permanent magnets in a plurality of array rows or columns that are alternated with arrays of rows or columns of containers and oriented to provide the desired magnetic field influence on the samples in the targeted containers. The arrays of magnets and/or arrays of containers can move in concert to expose the containers to varying magnetic field strength to mix the magnetic particles therein and thereby mix a plurality of samples in a plurality of containers concurrently. The containers can be batch-type closed containers or flowable open containers (forming a closed system) with flowable throughput tubes. The containers may be particularly suitable to process relatively small amounts of liquid elution volumes (such as about 0.01ml).

V. New Claims

Applicants respectfully submit that the subject matter recited in the new dependent claims which depend from Claim 1 or Claim 6 (Claims 19-28), the new independent claims, Claims 29, 30, and 32 (directed to methods) and Claims 36 and 37 (directed to devices) and any of their dependent claims are patentable over the cited art and supported by the application. These claims are submitted to provide a more complete claim set and entry and consideration of same is respectfully requested.

VI. Conclusion

Applicants respectfully submit that the application is in condition for allowance which action is requested. The Examiner is invited to contact the undersigned to resolve any outstanding issues.

Respectfully submitted,

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CERTIFICATE OF FACSIMILE TRANSMISSION

I hereby certify that this correspondence is being sent by facsimile transmission to Mail Stop Fee Amendment, Commissioner for Patents, PO Box 1450, Alexandria, VA 22313-1450, at (703) 872-9310 on June 19, 2003.

Rosa Lee Brinson 6/19/03
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